

EVALUATION OF METHYL BROMIDE ALTERNATIVE FUMIGANTS ON TOMATO UNDER POLYETHYLENE MULCH IN 1998.

D. W. Dickson, S. J. Locascio, and D. J. Mitchell, Departments of Entomology and Nematology, Horticultural Sciences, and Plant Pathology, University of Florida, Gainesville, FL 32611-0620.

Our objective was to compare two formulations of methyl bromide (Mbr) with alternative multi-purpose soil fumigants for management of root-knot nematodes, soilborne diseases, and weeds on tomato grown in drip irrigated polyethylene mulch culture in north central Florida. The experiment was conducted in the spring of 1998 at the Agronomy Research Farm, University of Florida, Gainesville, FL. The soil was an Arrendondo fine sand (>92%) and the site was infested with a high density of *Meloidogyne incognita* (southern root-knot nematode), and moderate densities of *Sclerotium rolfsii* (southern stem blight), and *Cyperus rotundus* (purple nutsedge) and *C. esculentus* (yellow nutsedge). Approximately one third of the field site was infested with *Ralstonia solanacearum* (bacterial wilt). The winter cover crop was common hairy vetch, which was turned under and the field disked 4 weeks before the treatments were applied. Plots were single row, 30 feet long on 6 foot centers with a 36 inch bed width. Plots were arranged in a randomized complete block and replicated six times. Beds were formed with a rototiller bed-press apparatus, and starter fertilizer applied and incorporated. Pebulate was applied at 4.0 lbs. a.i./acre to designated plots (all plots except those treated with Mbr and one treatment of metham sodium + chloropicrin) with a pressurized sprayer on the bed surface and incorporating 15 to 20 cm deep. Methyl bromide, chloropicrin, and 1,3-D/chloropicrin were applied preplant with a bed press mulch laying machine (Kennco Mfg., Ruskin, FL) rigged with swept-back chisels spaced 12 inches apart and set to deliver the fumigants 12 inches deep. The beds were covered immediately with black polyethylene mulch. The plots were drip irrigated twice daily and fertilized via drip tube weekly. The treatments, rates, and results are presented in Tables 1 and 2. The methyl bromide treatments, 1,3-D treatments (except C35 at low rate), and metham sodium + pic + pebulate increased yields compared to the control (P ; 0.05). The highest number of diseased plants compared with the fumigant treatments was in the control plots (P ; 0.05). Methyl bromide, C17, and C35 (except the low rate) reduced root-knot nematode galling compared with the control (P ; 0.05). Overall the fruit yields were low because of the very hot temperatures during the early growing season. A record number of days were recorded with temperatures above normal, and rainfall below normal.

Table 1. Comparisons of marketable number of fruit and weight of 'Agriset 761' tomato treated with different soil fumigants.

| Treatment | Rate/acre | Marketable no. fruit | Marketable wt. (lbs/plot) |
|------------------------|-----------------|----------------------|---------------------------|
| Mbr 98-2 | 400 lb | 302 a | 98 ab |
| Mbr 67-33 | 350 lb | 267 ab | 89.6 abc |
| C17 + peb. | 35 gal | 269 ab | 90.5 abc |
| C35 + peb. | 24 gal | 236 abc | 78.6 abcd |
| C35 + peb. | 30 gal | 273 ab | 92.5 abc |
| C35 + peb. | 36 gal | 301 a | 99.6 a |
| Met. sod. + peb. | 75 gal | 227 abc | 78.5 abcd |
| Met. sod. + pic | 75 gal + 150 lb | 215 bc | 69.5 cd |
| Met. sod. + pic + peb. | 75 gal + 75 lb | 221 bc | 72.7 bcd |
| Met. sod. + pic + peb. | 75 gal + 100 lb | 249 ab | 85.5 abcd |
| Met. sod. + pic + peb. | 75 gal + 150 lb | 279 ab | 92.7 abc |
| Untreated | | | |
| | | | 164 c 63.4 d |

Peb. = pebulate; met. sod. = metham sodium. Pebulate was applied at 4.0 lbs. a.i./ acre.

Table 2. Percentage disease hits and dead plants, root-knot nematode galling, and plant ratings of 'Agriset 761' tomato treated with different soil fumigants.

| Treatment | Rate/acre | Diseased plants (%) | Dead plants (%) | Root galling | Plant rating |
|------------------------|-----------------|---------------------|-----------------|--------------|--------------|
| Mbr 98-2 | 400 lb | 4.2 b | 2.8 b | 9.6 cd | 8.7 a |
| Mbr 67-33 | 350 lb | 2.8 b | 1.4 b | 4.1 d | 7.9 ab |
| C17 + peb. | 35 gal | 5.6 b | 4.2 b | 11.7 bcd | 7.8 ab |
| C35 + peb. | 24 gal | 2.8 b | 1.4 b | 35.7 abcd | 7.3 ab |
| C35 + peb. | 30 gal | 6.9 b | 5.6 b | 15.1 bcd | 7.8 ab |
| C35 + peb. | 36 gal | 1.4 b | 0.0 b | 8.9 cd | 7.8 ab |
| Met. sod. + peb. | 75 gal | 15.3 b | 12.5 b | 50.8 a | 6.8 b |
| Met. sod. + pic | 75 gal + 150 lb | 7.0 b | 6.9 b | 45.6 ab | 7.0 ab |
| Met. sod. + pic + peb. | 75 gal + 75 lb | 8.3 b | 4.2 b | 53.8 a | 6.8 b |
| Met. sod. + pic + peb. | 75 gal + 100 lb | 9.7 b | 9.7 b | 41.4 abc | 8.0 ab |
| Met. sod. + pic + peb. | 75 gal + 150 lb | 2.8 b | 0.0 b | 34.9 abcd | 7.6 ab |
| Untreated | | 47.2 a | 41.7 a | 51.1 a | 4.6 c |

Peb. = pebulate; met. sod. = metham sodium. Pebulate was applied at 4.0 lbs. a.i./ acre. Soilborne diseases included white mold and bacterial wilt.

Galling index scale: 0 = no detectable galls, 100 = 100% of root system galled.

Plant ratings based on 1 = very poor growing plants to 10 = excellent plant growth.

